

PERFLUOROCARBON

PN - JP2003275542 A 20030930
 TI - GASEOUS PFC DECOMPOSING SYSTEM
 FI - B01D53/34&134E ; B01D53/22 ; B01J19/08&E
 PA - DAINICHI SHOJI KK; NAITO TAKESHI; KOKOMA MASUHIRO
 IN - NAITO TAKESHI; ISHIKAWA TOSHIO; KOKOMA MASUHIRO
 AP - JP20020079391 20020320
 PR - JP20020079391 20020320
 DT - I

GASEOUS PFC

AN - 2003-884749 [82]
 TI - Perfluorocarbon gas decomposition device for decomposing perfluorocarbon gas, has membrane filter, atmospheric pressure plasma reactor and soda lime apparatus
 AB - JP2003275542 NOVELTY - Perfluorocarbon (PFC) gas decomposition device (7) has membrane filter (15) to separate PFC gas from gas emitted from oxide film etching apparatus, atmospheric pressure plasma reactor (9) to plasmify and decompose PFC gas into gas containing carbon dioxide and hydrogen fluoride, and soda lime apparatus (17) to convert carbon dioxide into calcium carbonate, and hydrogen fluoride into calcium fluoride and water.
 - DETAILED DESCRIPTION - The perfluorocarbon (PFC) gas decomposition device (7) comprises membrane filter (15), atmospheric pressure plasma reactor (9) and soda lime apparatus (17). Membrane filter is provided at downstream side of dry pump (5), which exhausts waste gas containing PFC gas used inside the chamber (1) of oxide film etching apparatus. The filter separates PFC gas from nitrogen gas and etching processed gas emitted from the dry pump. Atmospheric pressure plasma reactor (9) is provided at the downstream side of the flow path of the PFC gas separated from the filter. Helium gas as plasma excitation gas, and hydrogen gas and oxygen gas or water vapor as reactive gas are supplied to the plasma reactor to plasmify and decompose PFC gas into gas containing carbon dioxide and hydrogen fluoride. The soda lime apparatus (17) is provided at the downstream side of the plasma reactor to convert carbon dioxide (CO₂) into calcium carbonate (CaCO₃), and hydrogen fluoride (HF) into calcium fluoride (CaF₂) and water (H₂O) by reacting with soda lime (19). PFC gas is made harmless.
 - USE - For decomposing perfluorocarbon gas used in oxide film etching apparatus.
 - ADVANTAGE - Perfluorocarbon (PFC) gas decomposition device is easy to clean, does not influence lifetime of dry pump and does not change degree of vacuum in etching chamber. Dry harmless gas is exhausted from the device. Processing efficiency target of PFC gas is improved. Helium gas supplied as plasma excitation gas to the plasma reactor is recycled, and running cost of the device is reduced. Apparatus for neutralizing water obtained from the plasma reactor, is not required as soda lime apparatus is used instead of water scrubber.
 - DESCRIPTION OF DRAWING(S) - The figure shows the block view of the perfluorocarbon gas decomposition device. (Drawing includes non-English language text).
 - chamber of oxide film etching apparatus 1
 - dry pump 5
 - PFC gas decomposition device 7
 - atmospheric pressure plasma reactor 9
 - membrane filter 15
 - soda lime apparatus 17
 - soda lime 19
 - (Dwg.1/4)
 IW - GAS DECOMPOSE DEVICE DECOMPOSE GAS MEMBRANE FILTER ATMOSPHERE PRESSURE PLASMA REACTOR SODA LIME APPARATUS
 PN - JP2003275542 A 20030930 DW200382 B01D53/70 009pp
 IC - B01D53/22 ; B01D53/70 ; B01J19/08
 MC - L04-C07
 - U11-C07A1 U11-C07C3 U11-C09C U11-C09X V05-F05C
 DC - L03 U11 V05
 PA - (DAIN-N) DAINICHI SHOJI KK

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ABSTRACT

PN - JP2003275542 A 20030930
 TI - GASEOUS PFC DECOMPOSING SYSTEM
 AB - <P>PROBLEM TO BE SOLVED: To provide a plasma system which decomposes the gaseous PFC (perfluorocarbon) from an apparatus for etching an oxidized film, is easy to clean, does not affect the service life of a pump, does not change the vacuum degree of an etching chamber 1, prohibits backflow of H<SB>2</SB> of reactive gas to a chamber side and can be used for the apparatus for etching which is not provided with a turbo pump 3. <P>SOLUTION: The gaseous PFC is separated from the gaseous N<SB>2</SB> discharged from the pump by a membrane filter 15 disposed on the downstream side of a dry pump 5 for exhausting the interior of a chamber 1. The gaseous He is made into plasma excited gas and gaseous O<SB>2</SB>, gaseous H<SB>2</SB> or H<SB>2</SB>O vapor is made into the reactive gas by an atmospheric pressure plasma reaction system on the downstream. The gaseous PFC is made into the plasma and is converted to CO<SB>2</SB> and HF. The CO<SB>2</SB> is converted to CaCO<SB>3</SB> and HF to CaF and H<SB>2</SB> by a soda lime system on the downstream. Further, the gaseous He is separated from the gaseous N<SB>2</SB> and is reutilized as the plasma excited gas of the plasma reaction by a second membrane filter 7. <P>COPYRIGHT: (C)2003,JPO
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CLAIMS

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 - (KOGO-I) KOGOMA M
 - (NAIT-I) NAITO T
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 - SOLUTION: The gaseous PFC is separated from the gaseous N₂ discharged from the pump by a
 membrane filter 15 disposed on the downstream side of a dry pump 5 for exhausting the interior of a
 chamber 1. The gaseous He is made into plasma excited gas and gaseous O₂, gaseous H₂ or H₂O
 vapor is made into the reactive gas by an atmospheric pressure plasma reaction system on the
 downstream. The gaseous PFC is made into the plasma and is converted to CO₂ and HF. The CO₂ is
 converted to CaCO₃ and HF to CaF and H₂ by a soda line system on the downstream. Further, the
 gaseous He is separated from the gaseous N₂ and is reutilized as the plasma excited gas of the plasma
 reaction by a second membrane filter 7.
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 AGO - 20031205
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B 0 1 D 53/34

子マポート(参考)

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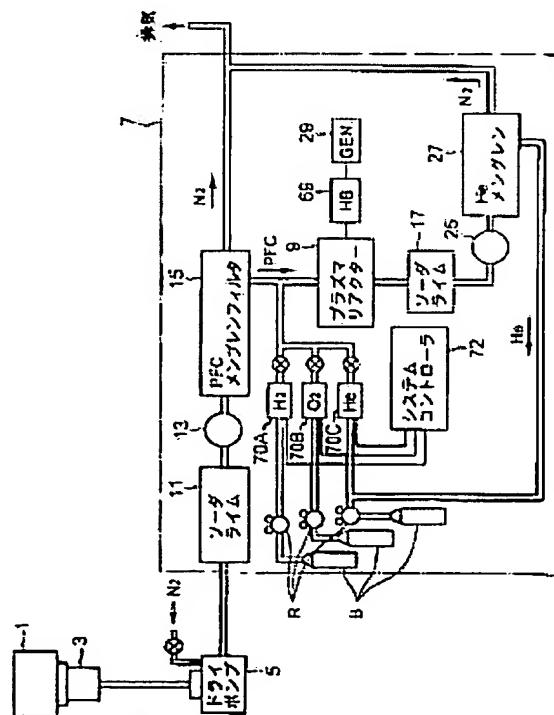
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(54)【発明の名称】 PFCガス分解装置

(57)【要約】

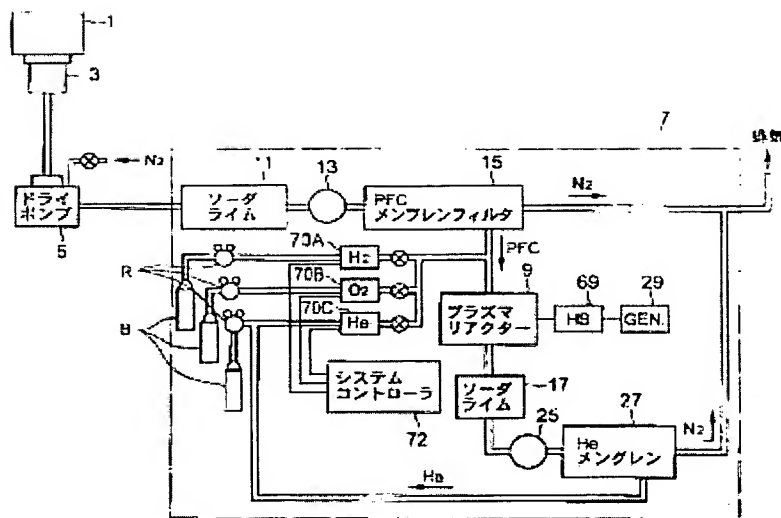
【課題】 酸化膜エッチング装置からのPFCガスを無害な物質に分解するプラズマ装置において、クリーニングが容易で、ポンプの寿命に影響を及ぼさず、エッチングチャンパー1の真空度を変化させず、反応ガスのH₂がチャンパー側に逆流せず、ターボポンプを用いないエッチング装置にも使用できるようにする。

【解決手段】 チャンパー1内を排気するドライポンプ5の下流側に設けるメンブレンフィルタ15で、PFCガスを、ポンプより排出されるN₂ガスから分離する。下流の大気圧プラズマ反応装置で、Heガスをプラズマ励起ガスとし、O₂ガス、H₂ガス、またはH₂O蒸気を反応ガスとし、PFCガスをプラズマ化してCO₂、HFに変換する。その下流のソーダライム装置17で、CO₂はCaCO₃に、HFはCaFとH₂Oに変換する。さらに、第2メンブレンフィルタ27で、N₂ガスなどからHeガスを分離してプラズマ反応のプラズマ励起ガスとして再利用する。

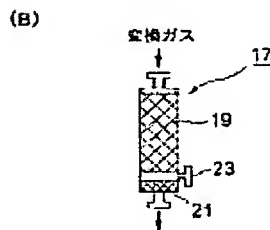
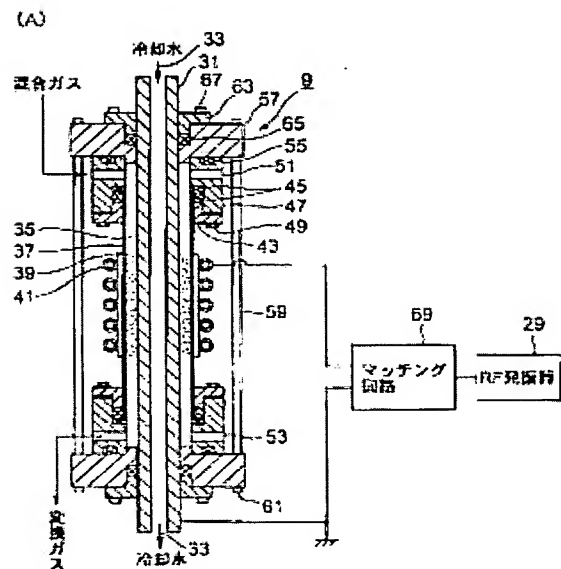


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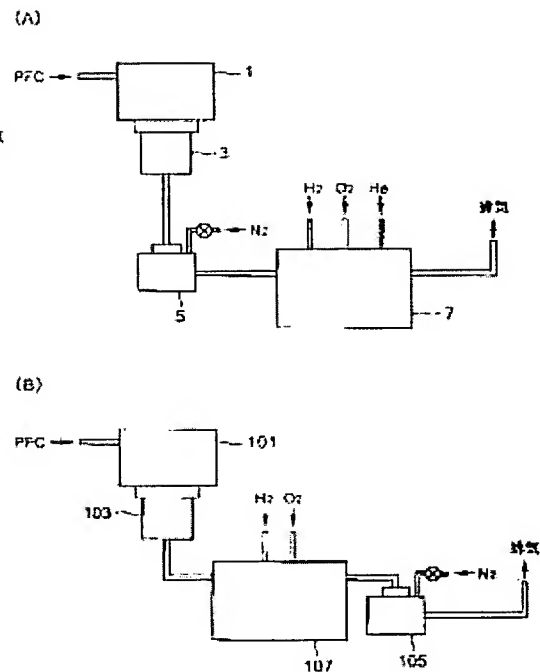
【41】



【図2】



【43】



【図4】

